

ABSTRACT

A system and a method solve the estimation problem of finding reflectance R and illumination L . The system and method to solve a functional of the unknown illumination L such that a minimum of the functional is assumed to yield a good estimate of the illumination L . Having a good estimate of the illumination L implies a good estimate of the reflectance R . The functional uses a variational framework to express requirements for the optimal solution. The requirements include: 1) that the illumination L is spatially smooth; 2) that the reflectance values are in the interval $[0,1]$ - thus, when decomposing the image S , the solution should satisfy the constraint $L > S$; 3) that among all possible solutions, the estimate of the illumination L should be as close as possible to the image S , so that the contrast of the obtained R is maximal; and 4) that the reflectance R complies with typical natural image behavior (e.g., the reflectance is piece-wise smooth).